

communication method to reduce the risks of interfering with
 an other system using the same frequency band and of a
 degrading of performance due to interference from the other
 system using the same frequency band. The system performs
 radio communication using the ISMA method. The base station
 10 has a packet detection circuit 14 for detecting a
 transmitted packet, an interference wave detection circuit 15
 for detecting a meteorological radar wave, and a generating
 circuit 17 for generating an idle signal that informs the
 terminals of an idle state of a communication channel. Upon
 receiving the idle signal, any of the terminals transmits a
 packet to be transmitted. If the base station detects an
 interference wave found on the channel, it suspends
 transmission of the idle signal. --

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IN THE CLAIMS

Please amend claims 1-37 by rewriting same to read as follows:

--1. (Amended) A radio communication device for radio communication using a predetermined frequency band, the device comprising:

information signal detection means for detecting an
 information signal transmitted from an other radio
 communication device;

idle signal transmission means for transmitting an idle
 signal that notifies the other radio communication device of

an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the other radio communication device by the information signal detection means; and

interference wave signal detection means for detecting an interference wave signal transmitted within the predetermined frequency band,

A² wherein the idle signal transmission means does not transmit the idle signal when the interference wave signal is detected.

--2. (Amended) A radio communication device for radio communication using a predetermined frequency band, the device comprising:

information signal detection means for detecting an information signal transmitted from an other radio communication device;

idle signal transmission means for transmitting an idle signal that notifies the other radio communication device of an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the other radio communication device by the information signal detection means;

interference wave signal detection means for detecting an interference wave signal transmitted within the predetermined frequency band;

interference wave signal transmission pattern estimation

means for estimating a temporal pattern of transmission of the interference wave signal detected by the interference wave signal detection means, wherein

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the idle signal transmission means computationally determines a timing for the idle signal and the information signal transmitted from the other radio communication device when the idle signal does not overlap a transmission time of the interference wave signal and transmits the idle signal at the computationally determined timing.

--3. (Amended) The radio communication device according to claim 2, wherein the interference wave signal detection means detects the interference wave signal before a start of an operation of the device.

--4. (Amended) The radio communication device according to claim 2, wherein the interference wave signal detection means detects the interference wave signal at regular intervals during an operation of the device.

--5. (Amended) The radio communication device according to claim 2, wherein the interference wave signal detection means detects the interference wave signal when the device is not operating.

--6. (Amended) The radio communication device according to claim 2, wherein

when the interference wave signal is detected the idle signal transmission means does not transmit the idle signal and computationally determines the timing for the idle signal and the information signal to be transmitted from the other radio communication device in response to the idle signal not overlapping the transmission period of the interference wave signal to transmit the idle signal at the determined timing.

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--7. (Amended) A radio communication device for radio communication using a predetermined frequency band, the device comprising:

information signal detection means for detecting an information signal transmitted from an other radio communication device;

idle signal transmission means for transmitting an idle signal that notifies the other radio communication device of an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the other radio communication device as by the information signal detection means;

interference wave signal detection means for detecting a signal level of an interference wave signal transmitted within the predetermined frequency band, wherein the idle signal transmission means transmits the idle signal by including level information indicating the signal level of the interference wave signal in the idle signal.

--8. (Amended) A radio communication device for radio communication using a predetermined frequency band, the device comprising:

information signal detection means for detecting an information signal transmitted from an other radio communication device;

idle signal transmission means for transmitting an idle signal that notifies the other radio communication device of an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the other radio communication device by the information signal detection means;

interference wave signal detection means for detecting an interference wave signal being transmitted within the predetermined frequency band;

interference wave signal transmission pattern estimation means for estimating a temporal pattern of transmission of the interference wave signal detected by the interference wave signal detection means,

wherein the idle signal transmission means transmits the idle signal by including time length information indicating a time length available for forwarding the information signal from the other radio communication means transmitted in response to the idle signal without overlapping the interference wave signal based on the pattern estimated by the interference wave signal transmission pattern estimation means in the idle signal.

--9. (Amended) A radio communication device for radio communication using a predetermined frequency range, the device comprising:

idle signal reception means for receiving an idle signal transmitted from an other radio communication device and indicating an availability of the predetermined frequency range;

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information signal transmission means for transmitting an information signal to the other radio communication device according to a timing of receiving the idle signal, wherein

the idle signal contains level information indicating a signal level of an interference wave signal transmitted within the predetermined frequency range; and

the information signal transmission means transmits the information signal to a base station to indicate a detectable signal level determined based upon the signal level of the interference wave signal.

--10. (Amended) A radio communication device for radio communication using a predetermined frequency range, the device comprising:

idle signal reception means for receiving an idle signal transmitted from an other radio communication device and indicating an availability of the predetermined frequency range;

information signal transmission means for transmitting an information signal to the other radio communication means

according to a timing of receiving the idle signal, wherein
the idle signal contains time length information
indicating a time length available for signal transmission
without overlapping the interference wave signal transmitted
within the predetermined frequency range; and

the information signal transmission means transmits the
information signal in the time length available for signal
transmission directed to a base station determined based upon
the time length information.

--11. (Amended) A radio communication system comprising a
base station and at least one terminal communication device for
radio communication between the base station and the terminal
communication device using a predetermined frequency band,

the base station having:

information signal detection means for detecting an
information signal transmitted from the terminal communication
device;

idle signal transmission means for transmitting an idle
signal that notifies the terminal communication device of an
idle state of the predetermined frequency band of non-detection
and of the information signal transmitted from the terminal
communication device by the information signal detection means;

interference wave signal detection means for detecting an
interference wave signal transmitted within the predetermined
frequency band,

wherein the idle signal transmission means does not

transmit the idle signal when the interference wave signal is detected; and

the terminal communication device transmits the information signal according to a timing of receiving the idle signal transmitted from the base station.

A² --12. (Amended) A radio communication system comprising a base station and at least one terminal communication device for radio communication between the base station and the terminal communication device using a predetermined frequency band,

the base station having:

information signal detection means for detecting an information signal transmitted from the terminal communication device;

idle signal transmission means for transmitting an idle signal notifying the terminal communication device of an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the terminal communication device by the information signal detection means;

interference wave signal detection means for detecting a level of an interference wave signal transmitted within the predetermined frequency band;

interference wave signal transmission pattern estimation means for estimating a temporal pattern of transmission of the interference wave signal detected by the interference wave signal detection means, wherein

the idle signal transmission means computationally

determines a timing for the idle signal and the information signal transmitted from the terminal communication device in response to the idle signal not overlapping a time of transmission of the interference wave signal based upon the pattern estimated by the interference wave signal transmission pattern estimation means and transmits the idle signal at the computationally determined timing; and

the terminal communication device transmits the information signal to the base station according to a timing of receiving the idle signal transmitted from the base station.

--13. (Amended) A radio communication system comprising a base station and at least one terminal communication device for radio communication between the base station the terminal communication device using a predetermined frequency band,

the base station having:

information signal detection means for detecting an information signal transmitted from the terminal communication device;

idle signal transmission means for transmitting an idle signal that notifies the terminal communication device of an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the terminal communication device by the information signal detection means;

interference wave signal detection means for detecting a level of an interference wave signal transmitted within the

predetermined frequency band, wherein

the idle signal transmission means transmits the idle signal by including level information indicating a signal level of the detected interference wave signal within the idle signal; and

the terminal communication device transmits the information signal at a detectable signal level to the base station according to a timing of receiving the idle signal transmitted from the base station and the level information contained in the idle signal.

--14. (Amended) A radio communication system comprising a base station and a terminal communication device for radio communication between the base station and the terminal communication device using a predetermined frequency band, the base station having:

information signal detection means for detecting an information signal transmitted from the terminal communication device;

idle signal transmission means for transmitting an idle signal that notifies the terminal communication device of an idle state of the predetermined frequency band and of non-detection of the information signal transmitted from the terminal communication device by the information signal detection means;

interference wave signal detection means for detecting a level of an interference wave signal transmitted within the

predetermined frequency band;

interference wave signal transmission pattern estimation means for estimating a temporal pattern of transmission of the interference wave signal detected by the interference wave signal detection means, wherein the idle signal transmission means transmits the idle signal by including time length information indicating a time length available for forwarding the information signal from the terminal communication device transmitted in response to the idle signal without overlapping the interference wave signal based upon the pattern estimated by the interference wave signal transmission pattern estimation means; and

the terminal communication device transmits the information signal in the time length available for signal transmission to the base station according to a timing of receiving the idle signal transmitted from the base station and the time length information contained in the idle signal.

--15. (Amended) A radio communication method for radio communication between a base station and at least one terminal communication device using a predetermined frequency band, comprising the steps of:

detecting an interference wave signal transmitted within the predetermined frequency band;

transmitting an idle signal from the base station to the terminal communication device that notifies the device of an availability of the predetermined frequency band and that

avoids the detected interference wave signal, wherein the terminal communication device transmits an information signal according to a timing of receiving the idle signal transmitted from the base station.

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--16. (Amended) A radio communication method for radio communication between a base station and at least one terminal communication device using a predetermined frequency band, comprising the steps of: detecting an interference wave signal transmitted within the predetermined frequency band, the detection performed by the base station;
estimating a temporal pattern of transmission of the detected interference wave signal based upon the interference wave signal;
computationally determining a timing for the idle signal and the information signal transmitted from the terminal communication device in response to the idle signal not overlapping a time of transmission of the interference wave signal based upon the estimated pattern and transmitting the idle signal at the computationally determined timing; and
transmitting the information signal from the communication device to the base station according to a timing of receiving the idle signal transmitted from the base station.

--17. (Amended) A radio communication method for radio communication between a base station and at least one terminal communication device using a predetermined frequency band,

comprising the steps of: detecting a level of an interference wave signal transmitted within the predetermined frequency band;

transmitting an idle signal that contains level information indicating the signal level of the detected interference wave signal to the terminal communication device; and

A² transmitting an information signal at a detectable signal level to the base station according to a timing of receiving the idle signal and the level information contained in the idle signal.

--18. (Amended) A radio communication method for radio communication between a base station and at least one terminal communication device using a predetermined frequency band,

comprising the steps of: detecting an interference wave signal transmitted within the predetermined frequency band;

estimating a temporal pattern of transmission of the interference wave signal detected;

transmitting an idle signal containing time length information indicating an available time length of the predetermined frequency band for forwarding an information signal from the terminal communication device without overlapping the interference wave signal based upon the estimated pattern to the terminal communication device; and

transmitting the information signal in the time length available for signal transmission to the base station according

to a timing of receiving the idle signal and the time length information contained in the idle signal.

--19. (Amended) A radio communication device for radio communication using a plurality of frequency channels, the device comprising:

information signal detection means for detecting an information signal transmitted from an other radio communication device;

idle signal transmission means for transmitting an idle signal by using one of the plurality of frequency channels to notify the other radio communication device of an availability of the frequency channel; and

interference wave signal detection means for detecting an interference wave signal transmitted within one of the plurality of frequency channels, the idle signal transmission means transmitting the idle signal using a frequency channel not having the detected interference wave signal.

--20. (Amended) The radio communication device according to claim 19, wherein the idle signal transmission means contains channel limiting information for limiting the frequency channels used for transmitting the idle signal out of the plurality of frequency channels in the idle signal.

--21. (Amended) The radio communication device according to claim 19, further comprising:

interference wave signal transmission pattern estimation means for estimating a temporal pattern of transmission of the interference wave signal on each of the plurality of frequency channels,

Az wherein the idle signal transmission means switches the frequency channel for the transmission of the idle signal on the estimated pattern to make the idle signal and the information signal transmitted from the other radio communication device in response to the idle signal not overlap the transmission of the interference wave.

--22. (Amended) The radio communication device according to claim 21, wherein the idle signal transmission means contains switch time information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for specifying the channel used in the idle signal after the switching is performed.

--23. (Amended) The radio communication device according to claim 21, further comprising:

information signal transmission means for transmitting an information signal to the other radio communication device, wherein the information signal transmission means contains switch information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for specifying the channel used in the idle signal after the switching is performed.

--24. (Amended) A radio communication device for radio communication using a plurality of frequency channels, the device comprising:

idle signal reception means for receiving an idle signal transmitted from an other radio communication device using one of the plurality of frequency channels to notify of an availability of the frequency channel;

information signal transmission means for transmitting an information signal to one of the other radio communication device and the origin of the idle signal according to a timing of receiving the idle signal, wherein the information signal transmission means transmits the information signal using the frequency channel used for the transmission of the idle signal.

--25. (Amended) The radio communication device according to claim 24, wherein

the idle signal contains channel limiting information for limiting the frequency channels used for transmitting the idle signal; and

the idle signal reception means performs a search operation on the frequency channels limited by the channel limiting information.

--26. (Amended) The radio communication device according to claim 24, wherein

the idle signal contains switch time information for switching the frequency channel used for the transmission of

the idle signal and channel specifying information for specifying a channel used after the switching is performed; and

the idle signal reception means switches to the frequency channel specified by the channel specifying information at the time specified by the switch time information.

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A2 --27. (Amended) The radio communication device according to claim 24, further comprising:

information signal reception means for receiving an information signal transmitted from the other radio communication device, wherein the information signal contains information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for specifying the channel used after the switching is performed; and

the idle signal reception means switches to the frequency channel specified by the channel specifying information at a time specified by the switch time information.

--28. (Amended) A radio communication system comprising a base station and at least one terminal communication device for radio communication between the base station and the terminal communication device using a plurality of frequency channels, the base station having:

• information signal detection means for detecting an information signal transmitted from the terminal communication device;

idle signal transmission means for transmitting an idle signal to the terminal communication device using one of the plurality of frequency channels to notify the terminal communication device of an availability of the frequency channel;

interference wave signal detection means for detecting an interference wave signal transmitted within one of the plurality of frequency channels,

wherein the idle signal transmission means transmits the idle signal using a frequency channel not having the detected interference wave signal; and

the terminal communication device having:

idle signal reception means for receiving the idle signal;

information signal transmission means for transmitting the information signal to one of the base station and an origin of the idle signal according to a timing of receiving the idle signal,

wherein the information signal transmission means transmits the information signal using the frequency channel used for the transmission of the idle signal.

--29. (Amended) The radio communication system according to claim 28, wherein

the idle signal transmission means contains channel limiting information for limiting the frequency channels used for transmitting the idle signal in the idle signal,

wherein the idle signal reception means performs a search

operation on the frequency channels limited by the channel limiting information to receive the idle signal.

--30. (Amended) The radio communication system according to claim 28, wherein

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the base station further has interference wave signal transmission pattern estimation means for estimating a temporal pattern of transmission of the interference wave signal on each of the plurality of frequency channels based upon the detected interference wave signal and the idle signal transmission means switches the frequency channel for the transmission of the idle signal on the estimated pattern so that the idle signal and the information signal transmitted from an other radio communication device in response to the idle signal do not overlap the transmission of the interference wave and transmits the idle signal; and

the terminal communication device further has idle signal reception means for receiving the idle signal and information signal transmission means for transmitting the information signal to the base station of an origin of the idle signal in response to a timing of reception of the idle signal, the information transmission means transmitting the information signal using the frequency channel used for the transmission of the idle signal.

--31. (Amended) The radio communication system according to claim 30, wherein

the idle signal transmission means contains switch time information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for specifying the channel used in the idle signal after the switching is performed; and

a² the idle signal reception means switches to the frequency channel specified by the channel specifying information at the time specified by the switch time information.

--32. (Amended) The radio communication system according to claim 30, wherein

the base station further has information signal transmission means for transmitting the information signal to the terminal communication device and the information signal transmission means contains switch time information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for specifying the channel to be used in the information signal after the switching is performed; and

the terminal communication device further has information signal reception means for receiving the information signal transmitted from the base station and switches to the frequency channel specified by the channel specifying information at a time specified by the switch time information.

--33. (Amended) A radio communication method for radio communication between a base station and at least one terminal

communication device using a plurality of frequency channels, comprising the steps of;

detecting an interference wave signal transmitted within one of the plurality of frequency channels;

transmitting an idle signal using a frequency channel not containing the detected interference wave signal to notify the terminal communication device of an availability of the frequency channel,

wherein the terminal communication device transmits an information signal using the frequency channel used for the transmission of the idle signal.

--34. (Amended) The radio communication method according to claim 33, wherein

idle signal transmission means in the base station contains channel limiting information for limiting the frequency channels used for transmitting the idle signal in the idle signal; and

idle signal reception means of the terminal communication device performs a search operation on the frequency channels limited by the channel limiting information to receive the idle signal.

--35. The radio communication method according to claim 33, wherein

the base station estimates a temporal pattern of transmission of the interference wave signal on each of the

plurality of frequency channels based upon the detected interference wave signal and switches the frequency channel for the transmission of the idle signal on the estimated pattern so the idle signal and the information signal transmitted from an other radio communication device in response to the idle signal do not overlap the transmission of the interference wave, and transmits the idle signal; and

the terminal communication device transmits the information signal to the base station using the frequency channel used for the transmission of the idle signal.

--36. (Amended) The radio communication method according to claim 35, wherein

the base station contains switch time information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for specifying the channel used in the idle signal after the switching is performed; and

the terminal communication device switches to the frequency channel specified by the channel specifying information at a time specified by the switch time information.

--37. (Amended) The radio communication method according to claim 35, wherein

the base station contains switch time information for switching the frequency channel used for the transmission of the idle signal and channel specifying information for